SCLSIS Functional Index Number (FIN) & FAST

9 December 2003

Briefing Purpose

- Why FIN
- What is FIN
- Interface with FAST

Why FIN

- FIN is about Material Condition Data in SCLSIS
  - Supports CNO tasking for single material condition database
    - Usable material condition data
- SEA 04 tasking to standardize HSC
- Material Condition Metrics
  - SMC Model, Ship Material Condition Model
    - Ship's readiness by warfare area based on Material Condition
    - HSC has not been sufficient

→ <u>FIN combines above efforts</u>

SCLSIS Type VI Record

- Type VI Record in CDMD-OA is the Material Condition Data Record
- FIN is the Record identifier
- Data in the Type VI Record links to the Type II Configuration Record

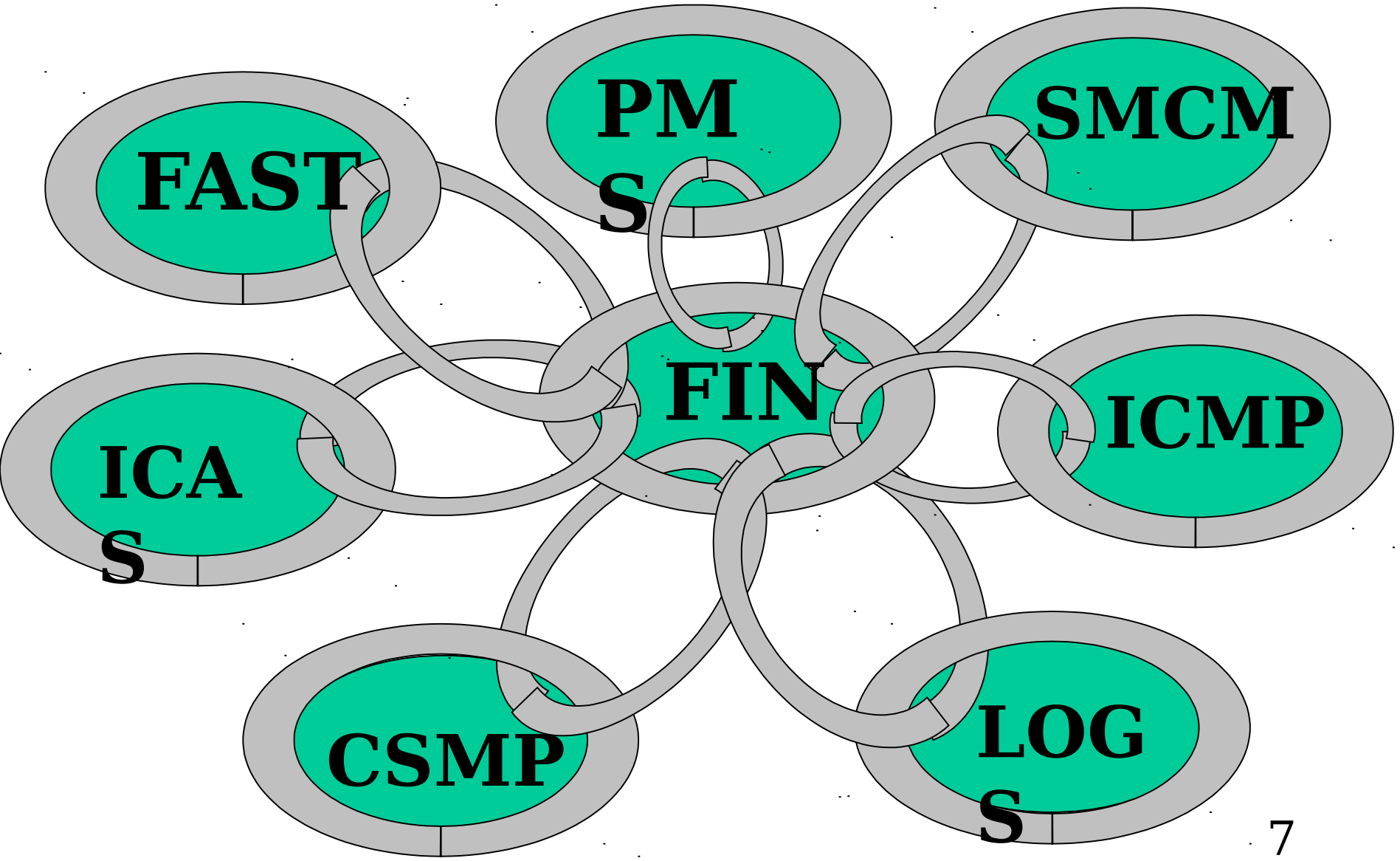
SCLSIS Type VI Record

- Section 1: Record Identifier
  - FIN establishment
- Section 2: Material Condition Criteria
  - Standards to measure against
    - » Parameters, their values and EOC values
    - » Acceptable limits, repair trigger set points……
    - » Weighting factors and criticalities (SMC model)
- Section 3: Material Condition History
  - Material Condition Data and EOC values time stamped
    - FTSC assessments, PMS, 2 Kilos, ICAS ……..
  - Data to retrieve and use
- Section 4: Links
  - Ship class / hull numbers
  - Assessment procedures, PMS, Tech. Manuals, EOSS…….
  - Associated equipment

What is FIN

- Functional Index Number, FIN
- Uniquely identify every shipboard item by function
- Identifies same item across ship classes
  - With the exception of location, FIN is the same
- Similar to HSC but standard Navy wide
  - Simplifies retrieving data across ship classes
- Three parts
  - Standard configuration codes/part by hierarchal number/location

Maintenance Information Link



FIN Responsibility

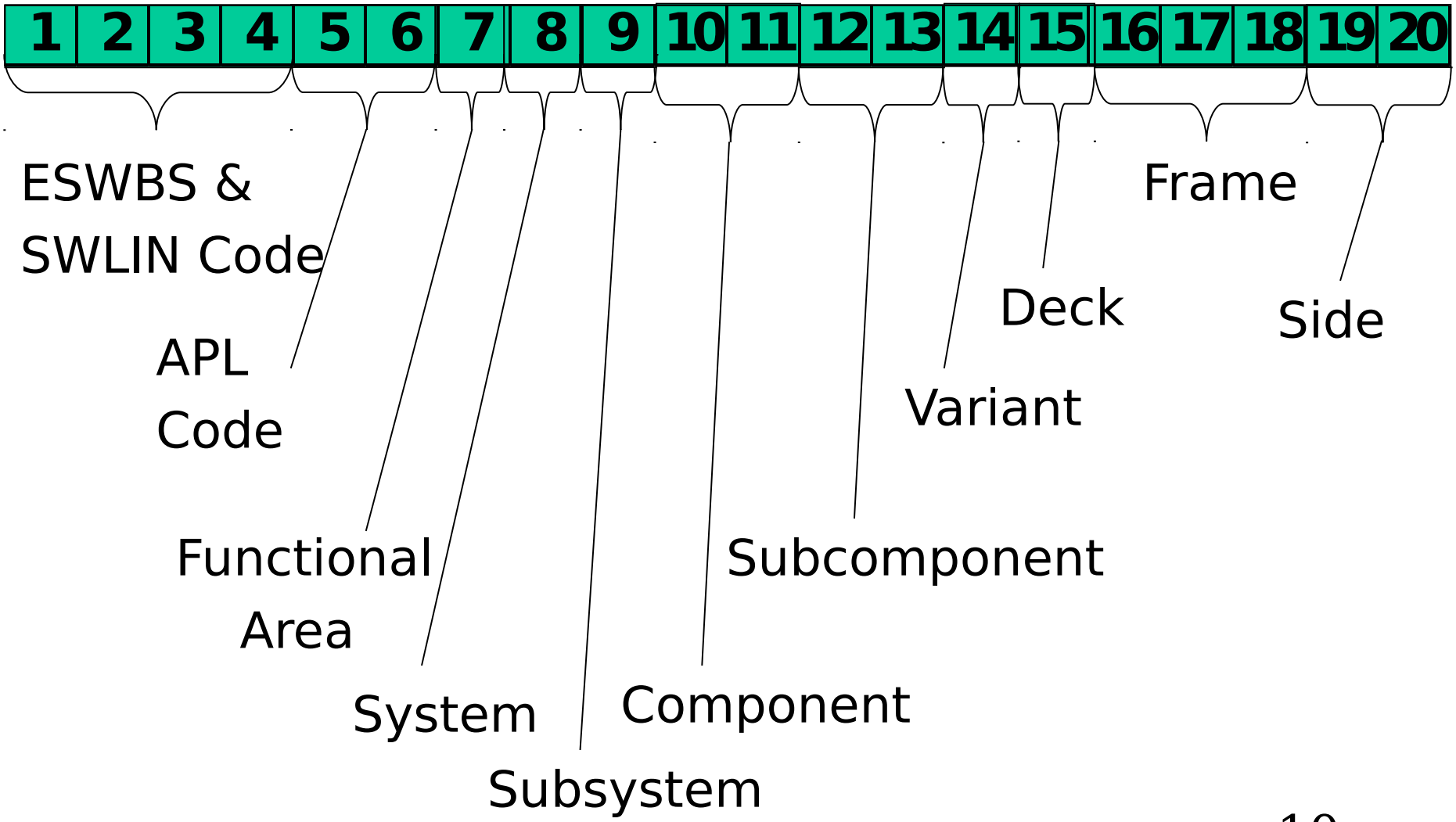
- WTH – Warranted Technical Holder
  - responsible for equipment/system
    - Includes configuration and maintenance Records→ Type VI Record, FIN
- Delegated authority to input/maintain Records
  - To EAM, Engineering Area Manager
  - To CE, Cognizant Engineer / ISEA
- Internet tool on NAVSEA 04M Web site
  - Interim tool to input and maintain
  - Move to CDMD-OA Type VI Record
    - (now in testing)

FIN Concept

- Standard Functional Index Number (FIN) that identifies:
  - Digits 1-4 System SWLIN
  - Digits 5 and 6 Common Configuration Item, (APL Code)
  - Digit 7 function
  - Digit 8 specific System
  - Digit 9 specific subsystem
  - Digits 10 & 11 specific component
  - Digits 12 & 13 specific subcomponents
  - Digit 14 specific variant
  - Digits 15-20 location using deck, frame and centerline relationship
- For levels 10 & 11 and 12-13, HEXDECIMAL notation allows the capture of up to 4,096 individual occurrences

Functional Index Number FIN

20 Digits



Functional Index Number FIN

Positions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

ESWBS & SWLIN Code

53300	POTABLE WATER	533	Z
53310	**WATER, POTABLE SERVICE**	**533**	**A**
53320	DISTILLED WATER SERVICE	533	B

Common Configuration Item 01 - Pumps

Subcomponent Impeller

Functional Area A = AUX

Variant No Variant

System Potable Water

Deck 2nd Deck

Subsystem PUMPS

Frame 35th Frame

Component NO 1 – Pump Liquid End

Side 1st to Starboard

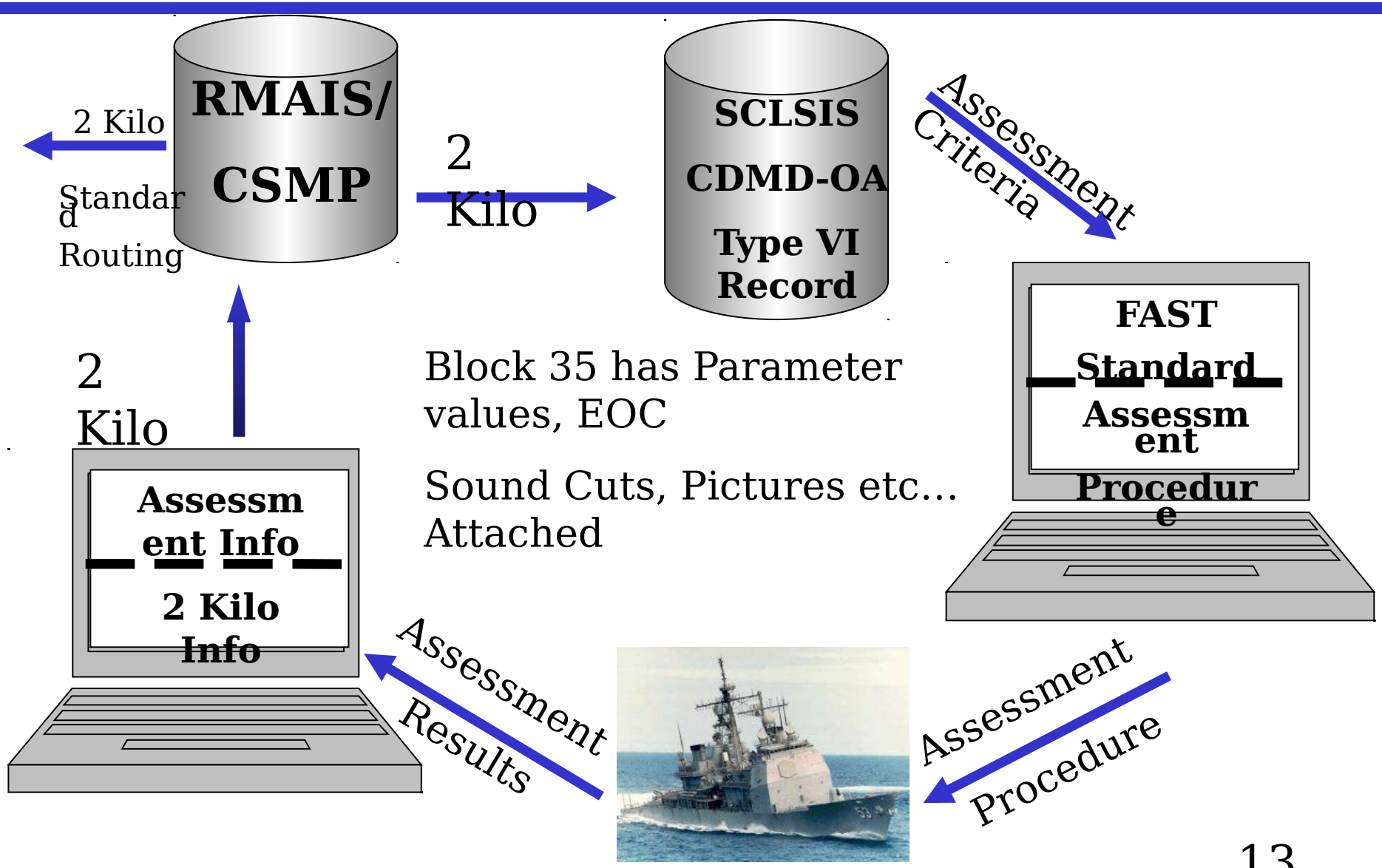
5	3	3	A	0	1	A	6	5	1	1	0	4	0	2	0	3	5	0	1

Values

Interface with FAST

- Standard Assessment Procedures
  - Common procedure PMS format
    - Links to Type VI Record
- Standard Assessment Criteria
  - Standard is stored in Type VI Record
    - Down load to FAST assessment procedure
  - Technical Authority Control
- Historical Material Condition Data
  - What was the condition during the assessment
    - Parameter values and EOC up load via 2K

Data Flow Type VI Record and FAST



FAST – FIN Interface

- Standard Assessment Procedure
  - Embedded XML Links to:
    - FIN
    - Assessment Criteria
  - Several / Many per procedure
- FAST generated 2 Kilo
  - Standard Info in Block 35
    - First line info on who & why generated
    - Parameter and EOC data behind special character string after the standard statements
    - Standardize with 2K generated from PMS

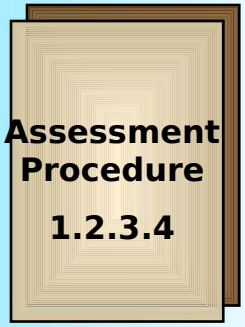
NAVSEA
NAVAL SEA SYSTEMS COMMAND

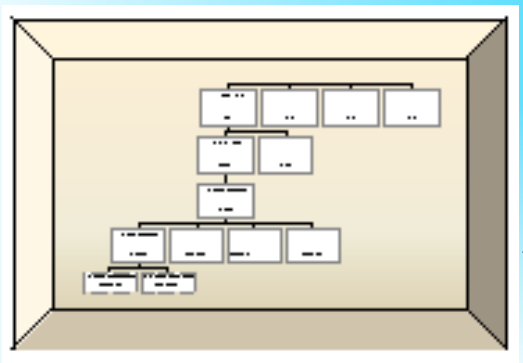
Additional SMC Model

Ship Material Condition Model

Assessment Procedure

PMS, 2K, ICAS, FAST.....

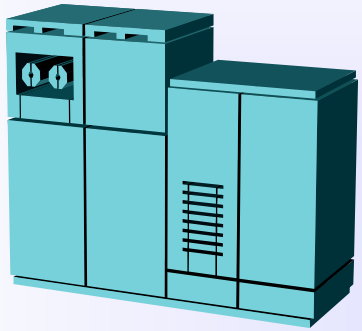




Numeric Algorithm

Metrics By Mission Area

ASU	C2W	CCC	FSO	INT	LOG	MIW	MOB	MOS
NCO 0.00	1.00	0.75	0.00	0.00	0.25	0.00	0.00	1.00	0.00

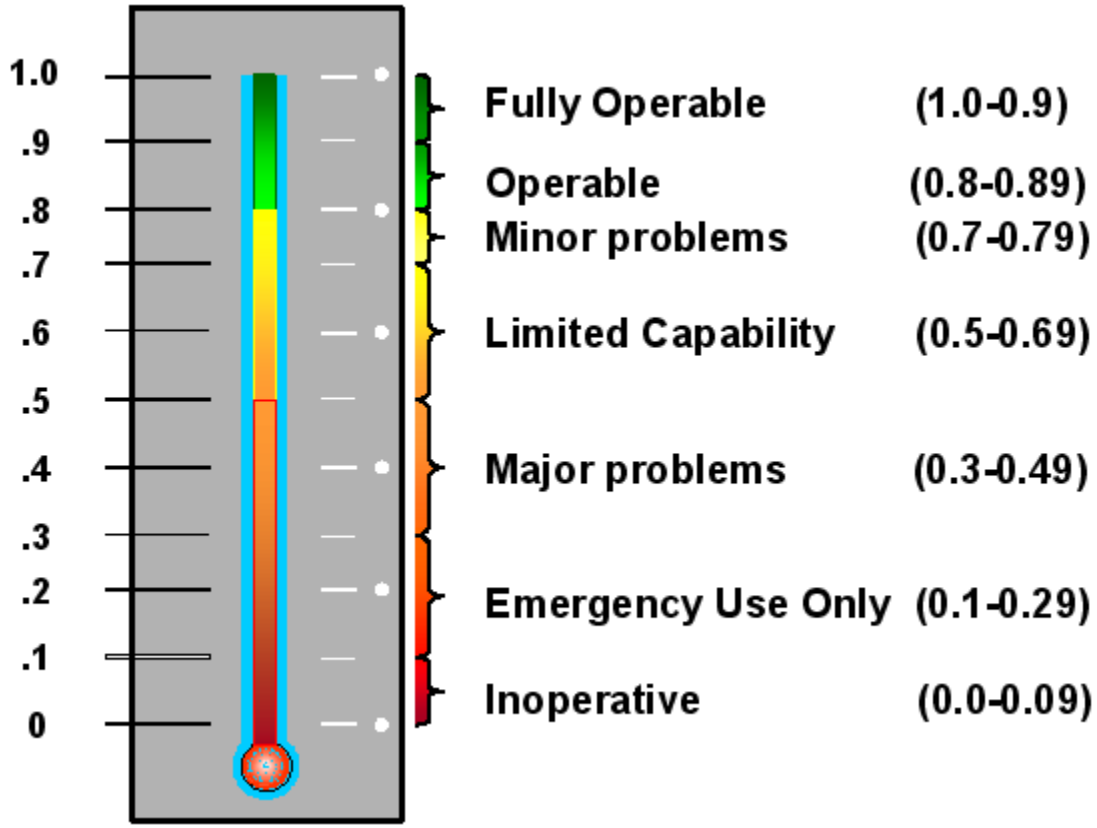


Data Depository

MCM Model Prototype

- Model Structure:
  - Hierarchical Structure
    - On board equipment structured to
      - Systems
      - Functional Areas
      - Mission Areas
  - Weight Factors 1 - 99
    - Relative importance of equipment, component or system to it's parent In a Diesel engine a piston is more important than an air filter.
  - Criticality Factors 0.00 – 1.00
    - Criticality of equipment, component or system to the proper functioning of it's parent. The engine can function without the air filter but functions extremely poorly with a bad piston.

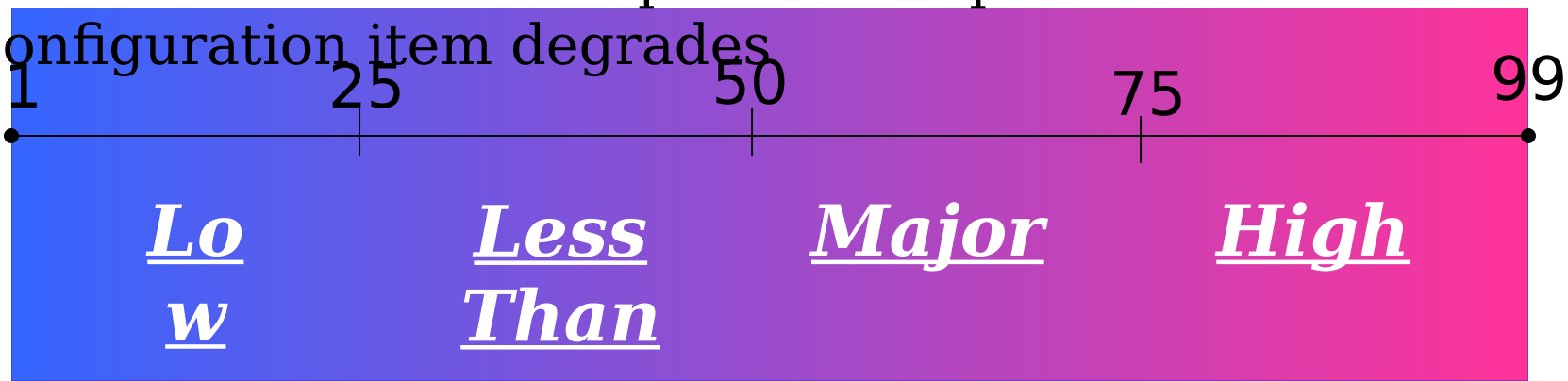
Equipment Operational Capability (EOC)



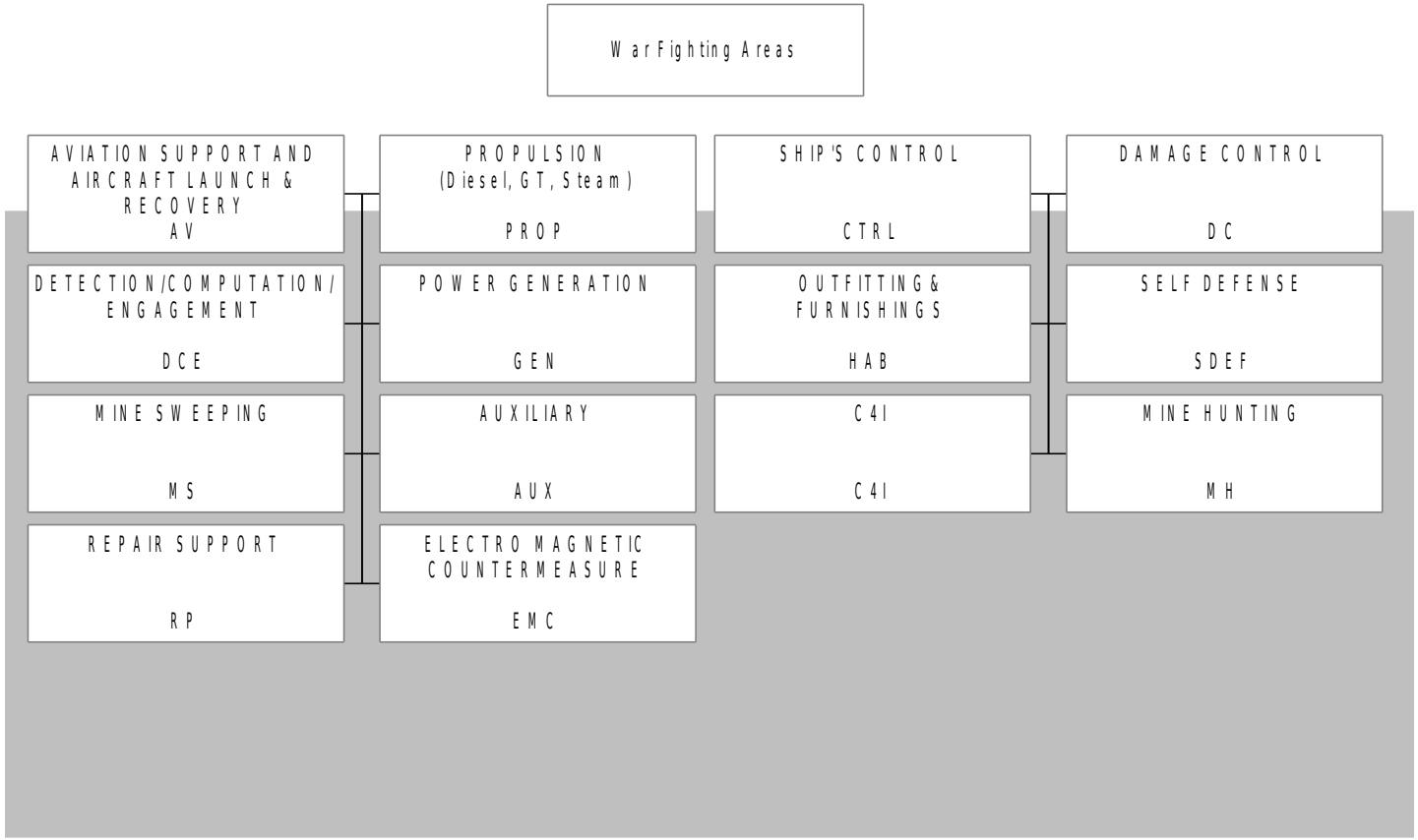
EOC = A dimensionless numeric value. EOC is determined by a measured objective evidence of a ship component or system compared to a standard such as a design criteria or normal operating parameters. Measured objective evidence is obtained using Scripted Standardized Assessment Procedure.

Weighting Factor

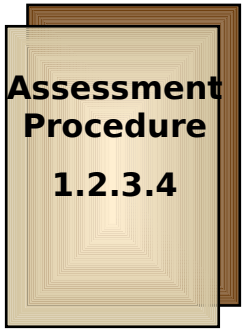
- A number value from 1 to 99 which indicates the relative importance of one configuration item to another
- A ranking of the children, at the same level of indenture with the same parent to one another
  - Scaling allows for granularity of importance over straight ranking
  - Allows configuration items to be equally important
- A number selected for each parent/ child which provides the desired impact on it's parent as the configuration item degrades



Standardized Functional Areas

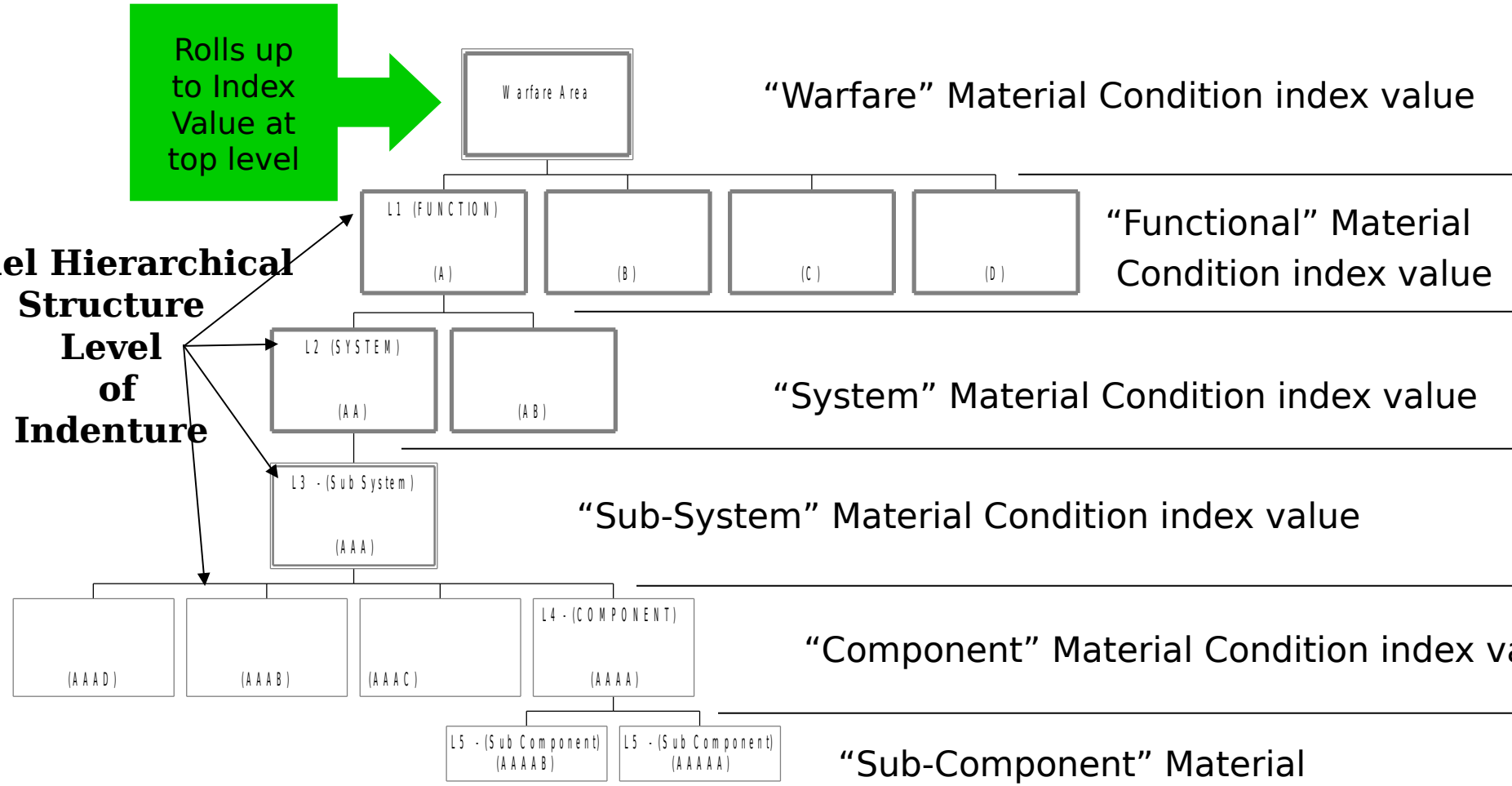


Scripted Standard Assessment Procedure (SSAP)



- Scripted, standardized procedure containing:
  - Reference Section
    - References, support equipment and material, configuration, procedures, etc.
  - Data Elements
    - Initial equipment status, problem description, equipment operational capability, recommended corrective action, parts required, status, technician / activity, root cause, etc.
  - Assessment Process
    - Step by step procedure where by measurement is accomplished to obtain objective evidence.
  - EOC Generation
    - Convert “Objective Evidence” to an EOC Value.

Convention for Material Condition Metrics



MCM Model Prototype

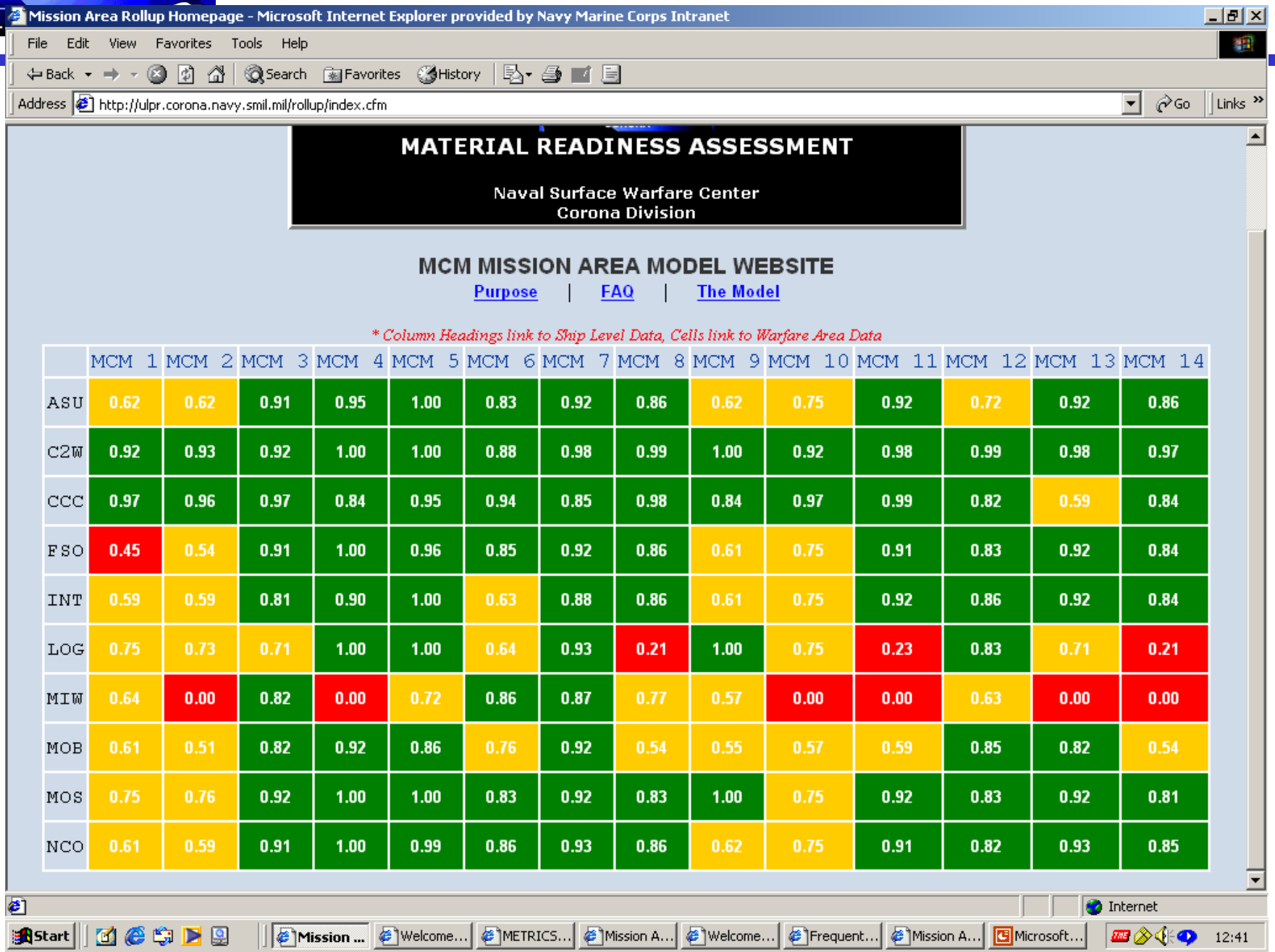
- Prototype Phase I Warfighting Report (Ashore) Currently In Use
  - CASREPs feeding the MCM Model.
  - Results posted in TRMS.
- Prototype Phase II Paperless Logs (Shipboard) Desktop Tested
  - ICAS, CSMP & SCHED 3.0 feeding the MCM Model.
  - Local reports.
- Prototype Phase III Availability Planning Tool Demo
- Prototype Phase IV Real Time Material Condition Display (Ashore)
  - Shipboard system feeding the MCM Model display.
    - Either CSMP feed or shipboard MCM Model feed
  - Local reports

MCM Model Prototype Phase I Warfighting Report (Ashore)

Currently In Use

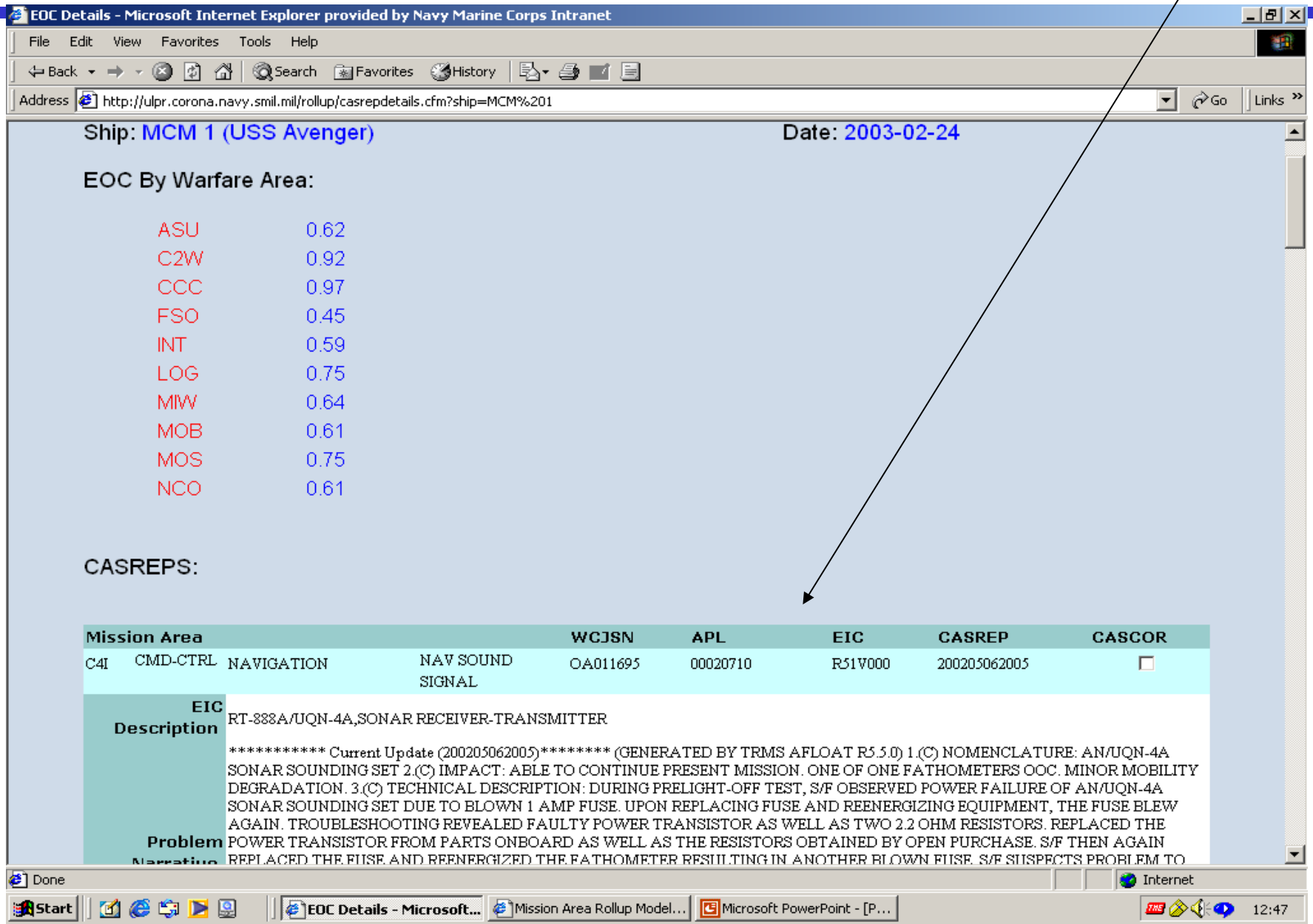
- Equipment linked to their Missions Areas
  - Assigned Weight Factors and Criticality Factors
  - System Equipment can impact many Mission Areas
- Input to Model is EOC values obtained from
  - CASREPs (currently) are the data input
    - CASREP to a system implies non-operation
  - Standardized Assessments, PMS, ICAS, CSMP or 2Kilos
- Algorithm calculates impact to the Mission Area (Roll-up)
- Availability Planning Tool (Demo)

Phase I - Warfighting Report

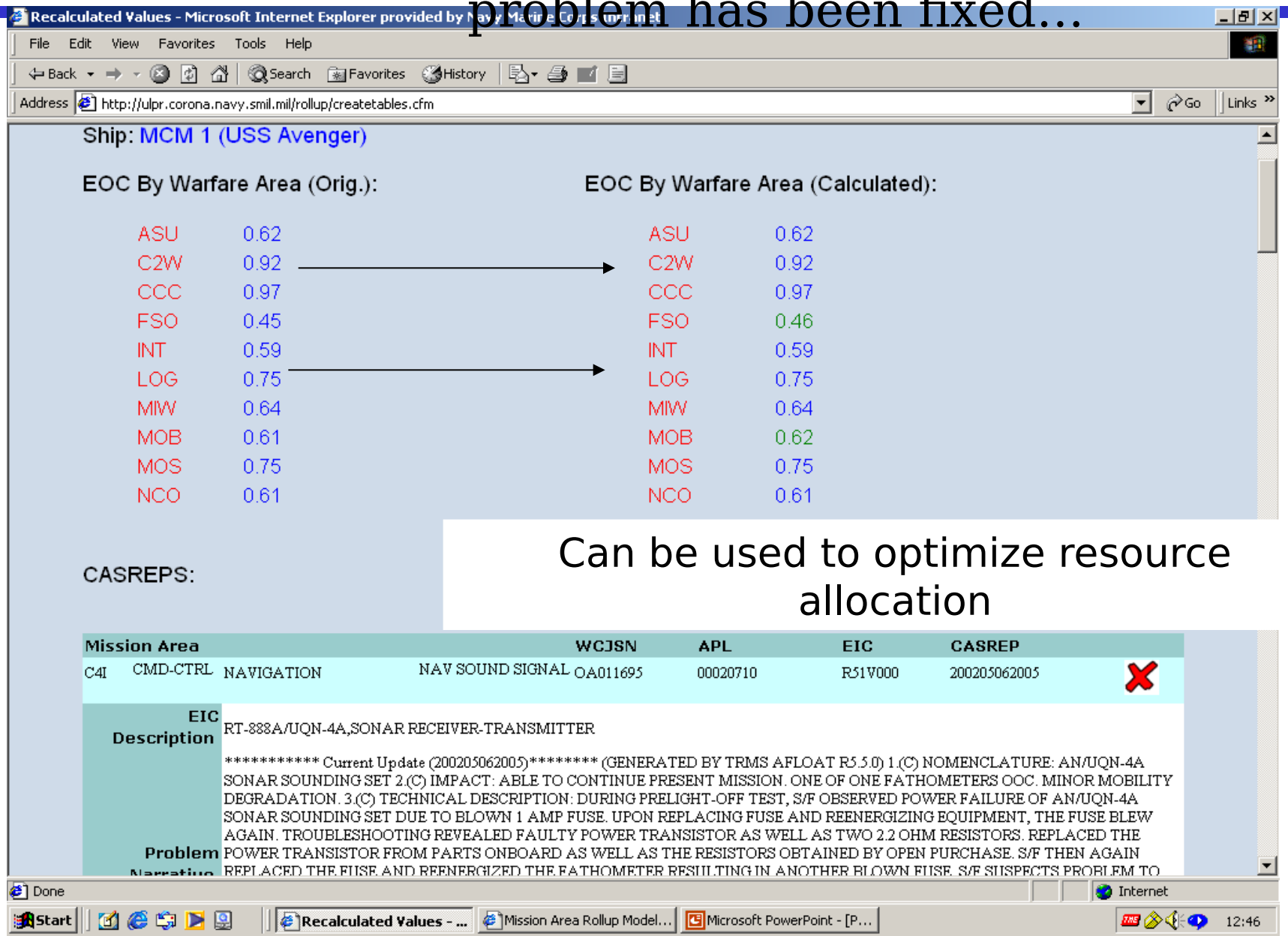


	MCM 1	MCM 2	MCM 3	MCM 4	MCM 5	MCM 6	MCM 7	MCM 8	MCM 9	MCM 10	MCM 11	MCM 12	MCM 13	MCM 14
ASU	0.62	0.62	0.91	0.95	1.00	0.83	0.92	0.86	0.62	0.75	0.92	0.72	0.92	0.86
C2W	0.92	0.93	0.92	1.00	1.00	0.88	0.98	0.99	1.00	0.92	0.98	0.99	0.98	0.97
CCC	0.97	0.96	0.97	0.84	0.95	0.94	0.85	0.98	0.84	0.97	0.99	0.82	0.59	0.84
FSO	0.45	0.54	0.91	1.00	0.96	0.85	0.92	0.86	0.61	0.75	0.91	0.83	0.92	0.84
INT	0.59	0.59	0.81	0.90	1.00	0.63	0.88	0.86	0.61	0.75	0.92	0.86	0.92	0.84
LOG	0.75	0.73	0.71	1.00	1.00	0.64	0.93	0.21	1.00	0.75	0.23	0.83	0.71	0.21
MIW	0.64	0.00	0.82	0.00	0.72	0.86	0.87	0.77	0.57	0.00	0.00	0.63	0.00	0.00
MOB	0.61	0.51	0.82	0.92	0.86	0.76	0.92	0.54	0.55	0.57	0.59	0.85	0.82	0.54
MOS	0.75	0.76	0.92	1.00	1.00	0.83	0.92	0.83	1.00	0.75	0.92	0.83	0.92	0.81
NCO	0.61	0.59	0.91	1.00	0.99	0.86	0.93	0.86	0.62	0.75	0.91	0.82	0.93	0.85

Clicking on the Header for MCM1 lists details of degraded material condition item



You can select an item and recalculate to see what the index values will be AFTER the problem has been fixed…



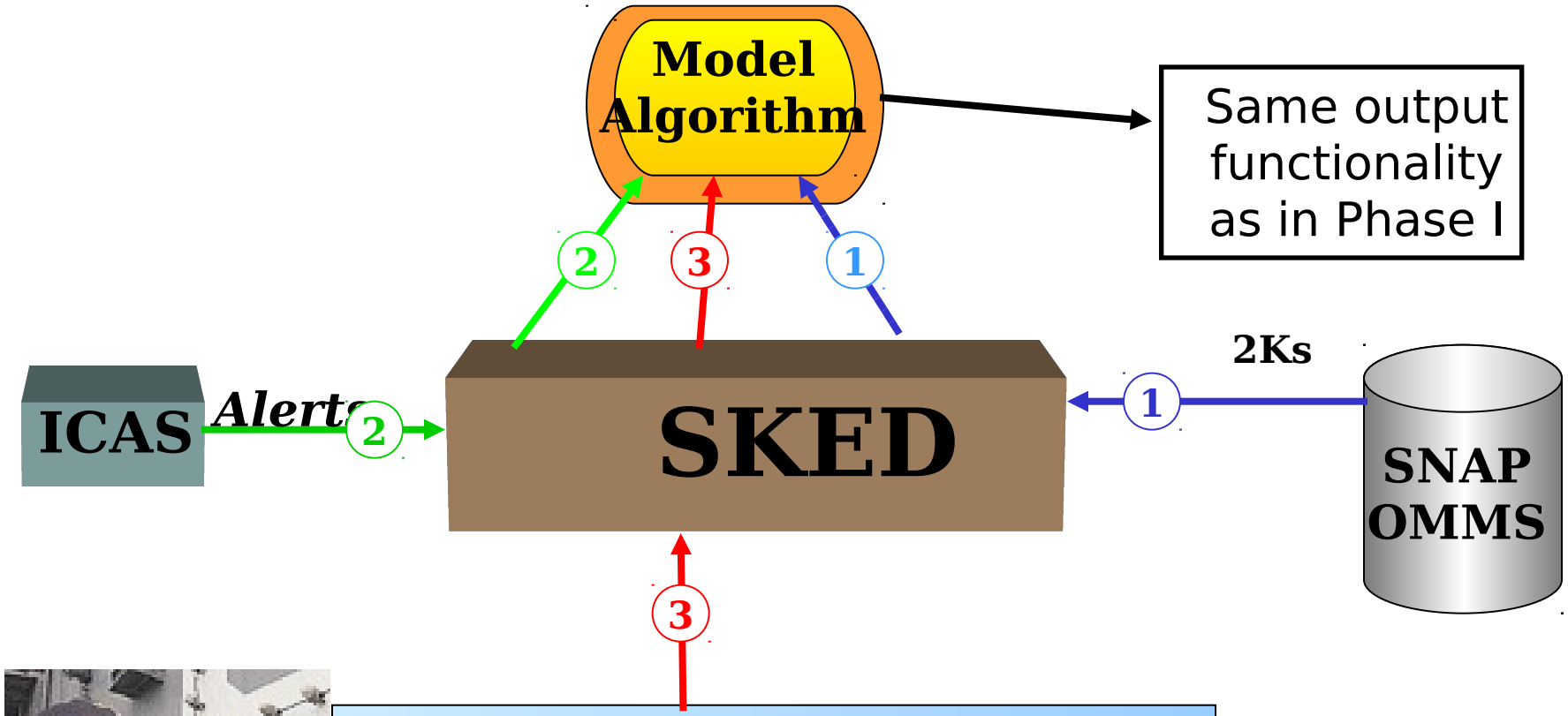
Can be used to optimize resource allocation

MCM Prototype Phase II Paperless Logs

- The model receiving input form ICAS, PMS, and 2K streams
- Desktop test completed in October 2003
- Limiting factor is quality of the CSMP data

MCM Prototype Phase II – Paperless Logs

Additional inputs to the Model in Phase II



Ship Material Condition Model

MCM Prototype
Phase III

Availability Planning Tool

SMC MODEL AVAILBILITY PLANNING TOOL

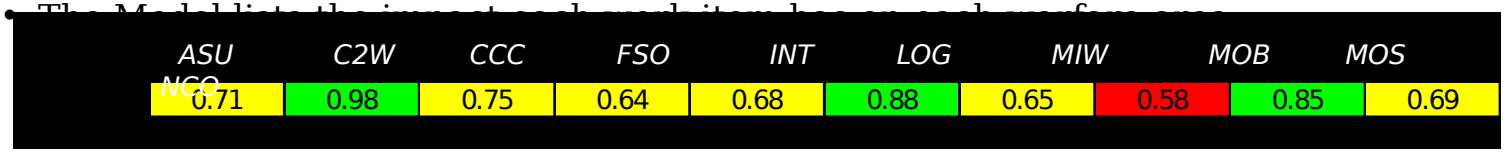
- SMC Model can assist Port Engineer in selecting / prioritizing the work package candidates
  - Allows for alignment with Ship's missions
  - Shows mission area impact for each work item
- Following example based on:
  - MCM with a quarterly availability
  - 50 work items from CSMP
  - Work items cover 30 different equipments

JSN	APL	EIC	EIC_DESC	NARR
DA01-0678	0-008110035	N181000	AEL MECH MS EQPT	MINESWEEPING BRIDLE CHAINS ARE DETERIORATING DUE TO NORMAL WEAR AND TEAR DURING MINESWEEPING OPERATIONS XXX REQUEST DEPOT ACTIVITY REMOVE (3) BRIDLES FROM SHIP, PROPERLY PREPARE, PAINT IN BLACK, AND RETURN TO SHIP DURING PMA.
DA01-A034	XSSTRUCTM03	A601000	02 LEVEL SUPERST	PER SEMAT II - THE LONGL BULKHEAD AT FR 38 (S) HAS A HOLE IN IT 72 INCHES ABOVE THE DECK. XXX REPAIR ACTIVITY REPAIR HOLE IN BHD IAW MANUAL FOR STRUCTURAL REPAIR OF MCM-1 CLASS SHIPS (S9100-AD-MMA-010/MCM-1 CLASS CHAPTER 15). DEADLINE DATE: 15 AUG 200
EA01-0731	043020337	T400000	A/C PLANT 1 COND	NR 1 A/C CONDENSER REQUIRES ACID WASHING. XXX REQUEST DEPOT ASSIST ACID FLUSH A/C CONDENSER FOR POST-DEPLOYMENT
EA01-0733	043020338	T503000	REFER NO.1 COND	#1 REEFER CONDENSER REQUIRES ACID FLUSHING. XXX REQUEST DEPOT ASSIST ACID FLUSH CONDENSER DURING NEXT AVAILABILITY PERIOD
EA01-0786	060950262	T400000	A/C PLANT 2 CPRS	NR 2 A/C COMPRESSOR FAILS VIBRATION ANALYSIS. XXX DEPOT OVERHAUL DURING FY03 PMA.
EA01-0787	060950263	T503000	REFRIGERATION CO	NR1 REEFER COMPRESSOR REQUIRES OVERHAUL. XXX SIMA PERFROM OVERHAUL DURING FY03 FMAV PRIOR TO PMA.
EA01-0790	016032675	B901000	NR 2 ASW PUMP	NR 2 ASW PUMP REQUIRES OVERHAUL. XXX DEPOT PERFROM OVERHAUL DURING FY03 PMA.
EA01-0791	619010250	T801000	FIRE PUMP NO 1	NR 1 FIRE AND FLUSHING PUMP REQUIRES OVERHAUL. XXX REQUEST SIMA TO OVERHAUL DURING CONCURRENT FMAV FY 03.
EA01-0796	XCOMPARTMNT	U000000	STEERING GEAR RO	NITROGEN BOTTLES ARE NOT MOUNTED WITH RESILIENT BRACKETS XXX REQUEST IMA TO MANUFACTURE AND INSTALL RESILENT GRADE "B" SHOCK MOUNTED BRACKETS.

SMC MODEL AVAILBILITY PLANNING TOOL

- With all the work candidates loaded SMC Model displays the mission impact:

- The Model lists the impact to each work item by each warfare area



- To a Port Engineer the top of the priority list is obvious

JSN	EIC_DESC	ASU	C2W	CCC	FSO	INT	LOG	MIW	MOB	MOS	NCO
EM01-1850	STBD MAIN REDUCT	0.072067	0.000000	0.000000	0.066021	0.070983	0.000000	0.036158	0.063660	0.000000	0.071355
EM01-1891	MN PRPLN DENG 1B	0.027673	0.000000	0.000000	0.024553	0.026646	0.000000	0.022506	0.023897	0.000000	0.026786
EM01-1985	RDCN GEAR STBY P	0.018977	0.000000	0.000000	0.022857	0.024488	0.000000	0.023369	0.021962	0.000000	0.024617
EM02-1294	SW SPLX STRAINER	0.010844	0.000000	0.000000	0.013061	0.013993	0.000000	0.013354	0.012549	0.000000	0.014067
EA01-0787	REFRIGERATION CO	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.012488	0.000000	0.000000
EA01-0790	NR 2 ASW PUMP	0.008133	0.000702	0.001303	0.009796	0.010495	0.048145	0.010016	0.009412	0.045833	0.010550
EA01-0734	REFER NO.2 COND	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.006244	0.000000	0.000000
OA01-0857	SHIPS DISTANCE I	0.007736	0.000000	0.000000	0.011658	0.000000	0.000000	0.004700	0.005492	0.000000	0.000000
EM02-1344	MEDIUM PRESSURE	0.002711	0.002105	0.000434	0.003265	0.003498	0.016575	0.003339	0.003137	0.016000	0.003517

SMC MODEL AVAILBILITY PLANNING TOOL

- The Port Engineer can use the SMC Model to see what jobs will have the most impact on the mission assigned to the ship.
  - He can see the impact each job has on every mission area
- For example:
  - The priority of these items for a ship assigned Intel Ops is

JSN	EIC_DESC	MIW
EM01-1850	STBD MAIN REDUCT	0.036158
EM01-1793	MN PRPLN DENG 1B	0.022506
EM01-1985	RDCN GEAR STBY P	0.023369
EM02-1294	SW SPLX STRAINER	0.013354
EA01-0790	NR 2 ASW PUMP	0.010016
OA0-10857	UWTR LOG	0.004700
EM02-1344	MP AIR COMP NO 2	0.003339
EE01-2274	OUTSIDE ELECTRIC	0.000406
EM02-1296	1A SSDG	0.000355
EM02-1295	1B SSDG	0.000237
EE01-R026	400HZ MOTOR GENE	0.000119
EA01-0796	STEERING GEAR RO	0.000107
OA01-0845	TB-30C/SQQ-32(V)	0.022616
OA01-0763	VEH HDLG SYS SLQ	0.008481
DA01-0677	AEL MECH MS EQPT	0.007068
DA01-0678	AEL MECH MS EQPT	0.007068

JSN	EIC_DESC	INT
EM01-1850	STBD MAIN REDUCT	0.070983
EM01-1793	MN PRPLN DENG 1B	0.026646
EM01-1985	RDCN GEAR STBY P	0.024488
EM02-1294	SW SPLX STRAINER	0.013993
EA01-0790	NR 2 ASW PUMP	0.010495
EA01-0796	STEERING GEAR RO	0.008813
EE01-2274	OUTSIDE ELECTRIC	0.004203
EM02-1296	1A SSDG	0.003966
EM02-1344	MP AIR COMP NO 2	0.003498
EM02-1295	1B SSDG	0.002644
EE01-R026	400HZ MOTOR GENE	0.001322

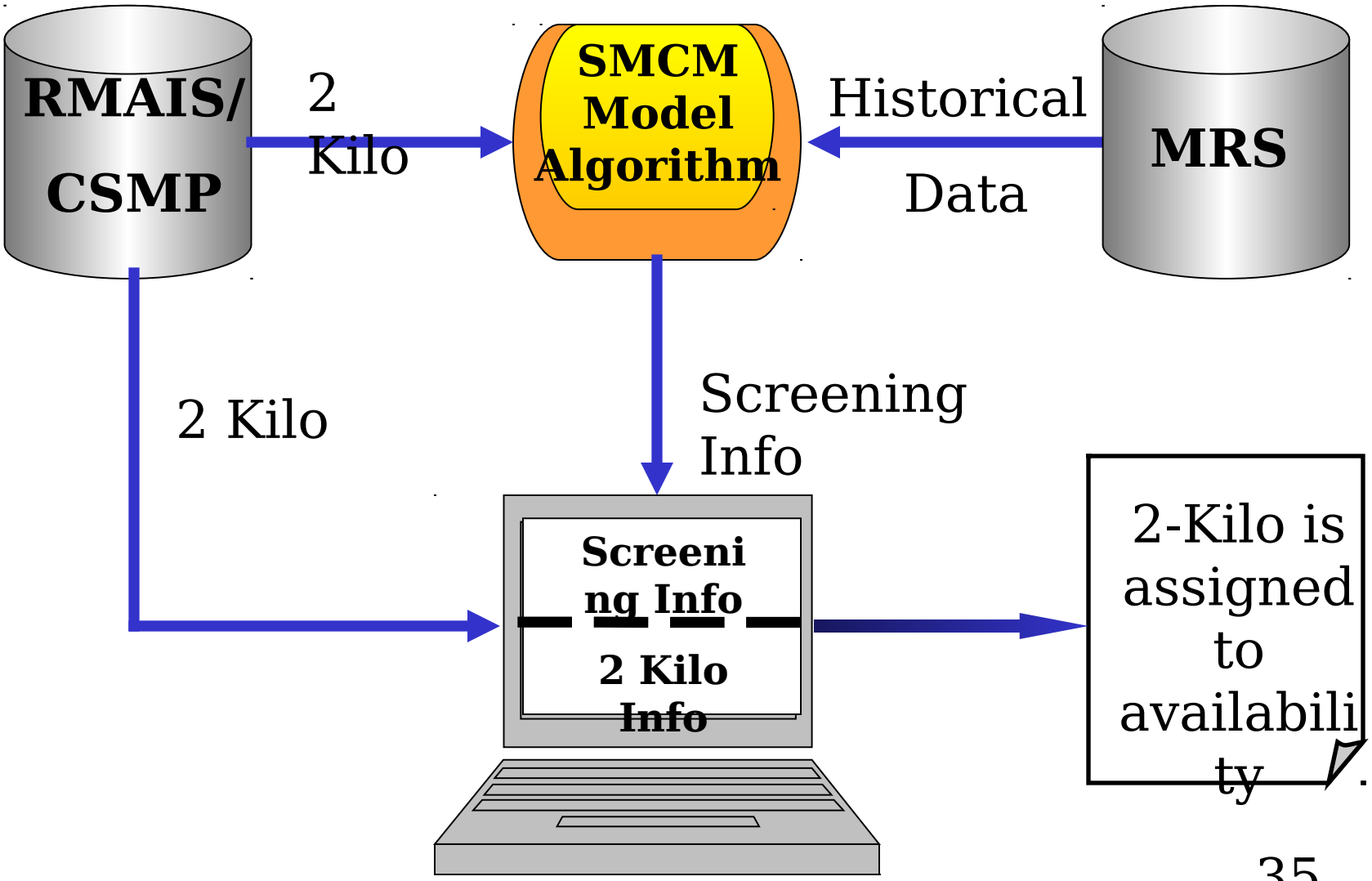
SMC MODEL AVAILBILITY PLANNING TOOL

- 2Killos can be screened through the incorporation of the Figure of Merit Module within the current Port Engineers Maintenance Support Tool - MST.

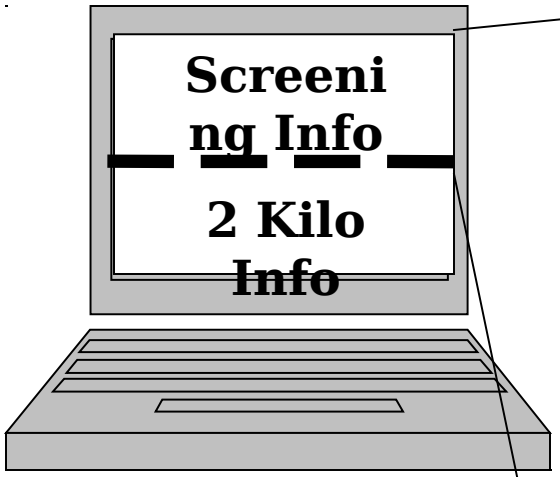
- With 2 Kilo and Historical data from the RAMIS and MRS data bases, the Figure of Merit Module uses the Ship Material Condition Metrics Model Algorithm to provide ship specific information.

- The MST program displays both the 2 Kilo and calculated Screening Information.

Screening Process Data Flow Using Ship Material Condition Metrics



Screening Process Data Flow Using Ship Material Condition Metrics



MRS Historical Information

Cost = ##### Time = ####

Current Material Condition Index = .2

0 to 1 Assignment = Ind IMA Tech

Current Availabilities with Assigned Work and Impact

Avail = ####
Budget $ = ######
Current Screened = ######
Budget MD = #####
Current Screened MD = ####
Duration Time = #####
Current Screened Time = #####
MCIV Improvement = 0 - 1